

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces

11.1 Local Transport Interface Groups

Interface Group 1 is provided with Type C Transmission Specifications, and Interface Groups 2 through 10 are provided with Type B Transmission Specifications, depending on the Feature Group and whether the Access Service is routed directly or through an access tandem. All Interface Groups are provided with Data Transmission Parameters.

Only certain premises interfaces are available at the customer designated premises. The premises interfaces associated with the Interface Groups may vary among Feature Groups. The various premises interfaces which are available with the Interface Groups, and the Feature Groups with which they may be used, are set forth in 11.1.1, following.

Ten Interface Groups are provided for terminating the Local Transport Entrance Facility at the customer's designated premises. Each Interface Group provides a specified premises interface (e.g., two-wire, four-wire, DS1, etc.). Where transmission facilities permit, and at the option of the customer, the Entrance Facility may be provided with optional features as set forth in Section 11.1.1, following.

As a result of the customer's access order and the type of Telephone Company transport facilities serving the customer designated premises, the need for signaling conversions or two-wire to four-wire conversions, or the need to terminate digital or high frequency facilities in channel bank equipment may require that Telephone Company equipment be placed at the customer designated premises. For example, if a voice frequency interface is ordered by the customer and the Telephone Company facilities serving the customer designated premises are digital, then Telephone Company channel bank equipment must be placed at the customer designated premises in order to provide the voice frequency interface ordered by the customer.

11.1.1 Interface Group 1

Interface Group 1, except as set forth in the following, provides two-wire voice frequency transmission at the point of termination at the customer's premises. The interface is capable of transmission of voice and associated telephone signals within the frequency bandwidth of approximately 300 to 3,000 Hz.

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11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.1 Local Transport Interface Groups (Cont'd)

11.1.1 Interface Group 1 (Cont'd)

Interface Group 1 is not provided in association with FGC and FGD when the first point of switching is an access tandem. In addition, Interface Group 1 is not provided in association with FGC or FGD when the first point of switching provides only four-wire terminations.

The transmission path between the point of termination at the customer designated premises and the first point of switching may be comprised of any form or configuration of plant capable of and typically used in the telecommunications industry for the transmission of voice and associated telephone signals within the frequency bandwidth of 300 to 3,000 Hz.

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11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.1 Local Transport Interface Groups (Cont'd)

11.1.1 Interface Group 1 (Cont'd)

The interface is provided with loop supervisory signaling. When the interface is associated with FGC or FGD, such signaling, except for two-way calling which is E&M signaling, will be reverse battery signaling.

11.1.2 Interface Group 2

Interface Group 2 provides four-wire voice frequency transmission at the point of termination at the customer designated premises. The interface is capable of transmission of voice and associated telephone signals within the frequency bandwidth of approximately 300 to 3,000 Hz.

The transmission path between the point of termination at the customer designated premises and the customer's serving wire center may be comprised of any form or configuration of plant capable of and typically used in the telecommunications industry for the transmission of voice and associated telephone signals within the frequency bandwidth of approximately 300 to 3,000 Hz.

The interface is provided with loop supervisory signaling. When the interface is associated with FGC or FGD, such signaling, except for two-way calling which is E&M signaling, will be reverse battery signaling.

11.1.3 Interface Group 3

Interface Group 3 provides group level analog transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals between the frequencies of 60 to 108 kHz, with the capability to channelize up to 12 voice

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11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.1 Local Transport Interface Group (Cont'd)

11.1.3 Interface Group 3 (Cont'd)

frequency transmission paths. Certain frequencies within the bandwidth of the Interface Group are reserved for Telephone Company use, e.g., pilot and carrier group alarm tones. Before the first point of switching, the Telephone Company will provide multiplex equipment to derive 12 transmission paths of frequency bandwidth approximately 300 to 3,000 Hz.

The interface is provided with individual transmission path SF supervisory signaling.

11.1.4 Interface Group 4

Interface Group 4 provides supergroup level analog transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals between the frequencies of 312 to 552 kHz, with the capability to channelize up to 60 voice frequency transmission paths. Certain frequencies within the bandwidth of the Interface Group are reserved for Telephone Company use, e.g., pilot and carrier group alarm tones. Before the first point of switching, the Telephone Company will provide multiplex and channel bank equipment to derive 60 transmission paths of frequency bandwidth of approximately 300 to 3,000 Hz.

The interface is provided with individual transmission path SF supervisory signaling.

11.1.5 Interface Group 5

Interface Group 5 provides mastergroup level analog transmission at the point of termination at the customer designated premises. The

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11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.1 Local Transport Interface Groups (Cont'd)

11.1.5 Interface Group 5 (Cont'd)

interface is capable of transmitting electrical signals between the frequencies of 564 to 3,084 kHz, with the capability to channelize up to 600 voice frequency transmission paths. Certain frequencies within the bandwidth of the Interface Group are reserved for Telephone Company use, e.g., pilot and carrier group alarm tones. Before the first point of switching, the Telephone Company will provide multiplex and channel bank equipment to derive 600 transmission paths of frequency bandwidth of approximately 300 to 3,000 Hz.

The interface is provided with individual transmission path SF supervisory signaling.

11.1.6 Interface Group 6

Interface Group 6 provides DS1 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 1.544 Mbps, with the capability to channelize up to 24 voice frequency transmission paths. Before the first point of switching, when analog switching utilizing analog terminations is provided, the Telephone Company will provide multiplex and channel bank equipment to derive 24 transmission paths of a frequency bandwidth of approximately 300 to 3,000 Hz. When digital switching or analog switching with digital carrier terminations is provided, the Telephone Company will provide a DS1 signal in D3/D4 format.

The interface is provided with individual transmission path bit stream supervisory signaling.

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11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.1 Local Transport Interface Groups (Cont'd)

11.1.7 Interface Group 7

Interface Group 7 provides DS1C level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 3.152 Mbps, with the capability to channelize up to 48 voice frequency transmission paths. Before the first point of switching, when analog switching utilizing analog terminations is provided, the Telephone Company will provide multiplex and channel bank equipment to derive up to 48 voice frequency transmission paths of a frequency bandwidth of approximately 300 to 3,000 Hz. When digital switching or analog switching with digital carrier terminations is provided, the Telephone Company will provide DS1 signals in D3/D4 format. The interface is provided with individual transmission path bit stream supervisory signaling.

11.1.8 Interface Group 8

Interface Group 8 provides DS2 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 6.312 Mbps, with the capability to channelize up to 96 voice frequency transmission paths. Before the first point of switching, when analog switching utilizing analog terminations is provided, the Telephone Company will provide multiplex and channel bank equipment in its office to derive up to 96 transmission paths of a frequency bandwidth of approximately 300 to 3,000 Hz. When digital switching, or analog switching with digital carrier terminations is provided, the Telephone Company will provide DS1 signals in D3/D4 format.

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11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.1 Local Transport Interface Groups (Cont'd)

11.1.8 Interface Group 8 (Cont'd)

The interface is provided with individual transmission path bit stream supervisory signaling.

11.1.9 Interface Group 9

Interface Group 9 provides DS3 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 44.736 Mbps, with the capability to channelize up to 672 voice frequency transmission paths. Before the first point of switching, when analog switching utilizing analog terminations is provided, the Telephone Company will provide multiplex and channel bank equipment to derive up to 672 transmission paths of a frequency bandwidth of approximately 300 to 3,000 Hz. When digital switching, or analog switching with digital carrier terminations is provided, the Telephone Company will provide DS1 signals in D3/D4 format.

The interface is provided with individual transmission path bit stream supervisory signaling.

11.1.10 Interface Group 10

Interface Group 10 provides DS4 level digital transmission at the point of termination at the customer designated premises. The interface is capable of transmitting electrical signals at a nominal 274.176 Mbps, with the capability to channelize up to 4,032 voice frequency transmission paths. Before the first point of switching, when analog switching utilizing analog

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### 11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

#### 11.1 Local Transport Interface Groups (Cont'd)

##### 11.1.10 Interface Group 10 (Cont'd)

terminations is provided, the Telephone Company will provide multiplex and channel bank equipment to derive up to 4,032 transmission paths of a frequency bandwidth of approximately 300 to 3,000 Hz. When digital switching or analog switching with digital carrier terminations is provided, the Telephone Company will provide DS1 signals in D3/D4 format. The interface is provided with individual transmission path bit stream supervisory signaling.

##### 11.1.11 Available Premises Interface Codes

Following is a matrix showing, for each Interface Group, which premises interface codes are available as a function of the Telephone Company switch supervisory signaling and Feature Group. For explanations of these codes, see the Glossary of Channel Interface Codes in Section 11.3, following.

<u>Interface Group</u>	<u>Telephone Company Switch Supervisory Signaling</u>	<u>Premises Interface Code</u>	<u>Feature Group Group C</u>	<u>Feature Group Group D</u>
1	RV, EA, EB, EC	2DX3	X	X
	RV, EA, EB, EC	4EA3-E	X	X
	RV, EA, EB, EC	4EA3-M	X	X
	RV, EA, EB, EC	6EB3-E	X	X
	RV, EA, EB, EC	6EB3-M	X	X
	EA, EB, EC	6EC3	X	X
	RV	2RV3-0	X	X
	RV	2RV3-T	X	X



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#### 11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

##### 11.1 Local Transport Interface Groups (Cont'd)

##### 11.1.11 Available Premises Interface Codes (Cont'd)

<u>Interface Group</u>	<u>Telephone Company Switch Supervisory Signaling</u>	<u>Premises Interface Code</u>	<u>Feature Group Group C</u>	<u>Feature Group Group D</u>
2	RV, EA, EB, EC	4SF2	X	X
	RV, EA, EB, EC	4DX2	X	X
	RV, EA, EB, EC	6DX2	X	X
	RV, EA, EB, EC	6EA2-E	X	X
	RV, EA, EB, EC	6EA2-M	X	X
	RV, EA, EB, EC	8EB2-E	X	X
	RV, EA, EB, EC	8EB2-M	X	X
	EA, EB, EC	8EC2-M	X	X
	RV	4RV2-O	X	X
	RV	4RV2-T	X	X
	RV	4RV3-O	X	X
	RV	4RV3-T	X	X
3	RV, EA, EB, EC	4AH5-B	X	X
4	RV, EA, EB, EC	4AH6-C	X	X
5	RV, EA, EB, EC	4AH6-D	X	X
6	RV, EA, EB, EC	4DS9-15	X	X
	RV, EA, EB, EC	4DS9-15L	X	X
	SS7	4DS9-15L	X	X
7	RV, EA, EB, EC	4DS9-31	X	X
	RV, EA, EB, EC	4DS9-31L	X	X
	SS7	4DS9-31	X	X

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#### 11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

##### 11.1 Local Transport Interface Groups (Cont'd)

##### 11.1.11 Available Premises Interface Codes (Cont'd)

<u>Interface Group</u>	<u>Telephone Company Switch Supervisory Signaling</u>	<u>Premises Interface Code</u>	<u>Feature Group Group C</u>	<u>Feature Group Group D</u>
8	RV, EA, EB, EC	4DSO-63	X	X
	RV, EA, EB, EC	4DS0-63L	X	X
	SS7	4DS0-63	X	X
9	RV, EA, EB, EC	4DS6-44	X	X
	RV, EA, EB, EC	4DS6-44L	X	X
	SS7	4DS6-44	X	X
10	RV, EA, EB, EC	4DS6-27	X	X
	RV, EA, EB, EC	4DS6-27L	X	X

##### 11.1.12 Supervisory Signaling

- For Interface Groups 1 and 2

DX Supervisory Signaling,  
 E&M Type I Supervisory Signaling,  
 E&M Type II Supervisory Signaling, or  
 E&M Type III Supervisory Signaling

- For Interface Group 2

SF Supervisory Signaling, or  
 Tandem Supervisory Signaling

- For Interface Groups 6 through 10

These Interface Groups may be provided with individual transmission path SF supervisory signaling where such signaling is available in Telephone Company central offices. Generally, such signaling is available only where the entry switch provides an analog, i.e., non digital, interface to the transport termination, and is not available in combination with the SS7 Signaling option.

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service

11.2.1 Standard Transmission Specifications

Following are descriptions of the two Standard Transmission Specifications available with Switched Access Service Feature Group C. The specific applications in terms of Feature Group C and Interface Groups with which the Feature Group Standard Transmission Specifications are provided are set forth in Section 6.5, preceding.

(A) Type B Transmission Specifications

Type B Transmission Specifications are provided with the following parameters:

(1) Loss Deviation

The maximum Loss Deviation of the 1,004 Hz loss relative to the Expected Measured Loss (EML) is plus or minus 2.5 dB.

(2) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 2,804 Hz frequency band relative to loss at 1,004 Hz is -2.0 dB to +4.0 dB.

(3) C-Message Noise

The maximum C-Message Noise for the transmission path at the route miles listed is less than or equal to:

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.2 Transmission Specifications Switched Access Service (Cont'd)11.2.1 Standard Transmission Specifications (Cont'd)(A) Type B Transmission Specifications (Cont'd)(3) C-Message Noise (Cont'd)

<u>Route Miles</u>	<u>C-Message Noise Type B2</u>
less than 50	35 dBrnCO
51 to 100	37 dBrnCO
101 to 200	40 dBrnCO
201 to 400	43 dBrnCO
401 to 1,000	45 dBrnCO

(4) C-Notch Noise

The maximum C-Notch Noise, utilizing a -16 dBm0 holding tone is less than or equal to 47 dBrnCO.

(5) Echo Control

Echo Control, identified as Equal Level Echo Path Loss for FGC and expressed as Echo Return Loss (ERL) and Singing Return Loss (SRL), is dependent on the routing, i.e., whether the service is routed directly from the customer's point of termination (POT) to the end office or via an access tandem. The ERL and SRL also differ by Feature Group, type of termination, and type of transmission path. They are greater than or equal to the following:

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.2 Transmission Specifications Switched Access Service (Cont'd)11.2.1 Standard Transmission Specifications (Cont'd)(A) Type B Transmission Specifications (Cont'd)(5) Echo Control (Cont'd)

	<u>Echo Return Loss</u>	<u>Singing Return Loss</u>
POT to Access Tandem		
- Terminated in 4-Wire trunk	21 dB	14 dB
- Terminated in 2-Wire trunk	16 dB	11 dB
POT to End Office		
- Direct	16 dB	11 dB
- Via Access Tandem		
. For FGC access (Effective 4-wire trans- mission path at end office)	16 dB	11 dB
. For FGC access (Effective 2-Wire trans- mission path at end office)	13 dB	6 dB

(6) Standard Return Loss

Standard Return Loss, expressed as Echo Return Loss and Singing Return Loss, on two-wire ports of a four-wire point of termination shall be equal to or greater than:

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.2 Transmission Specifications Switched Access Service (Cont'd)11.2.1 Standard Transmission Specifications (Cont'd)(A) Type B Transmission Specifications (Cont'd)(6) Standard Return Loss (Cont'd)Echo Return LossSinging Return Loss

5 dB

2.5 dB

(B) Type C Transmission Specifications

Type C Transmission Specifications are provided with the following parameters:

(1) Loss Deviation

The maximum Loss Deviation of the 1,004 Hz loss relative to the Expected Measured Loss (EML) is plus or minus 3.0 dB.

(2) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 2,804 Hz frequency band relative to loss at 1,004 Hz is -2.0 dB to +5.5 dB.

(3) C-Message Noise

The maximum C-Message Noise for the transmission path at the route miles listed is less than or equal to:

<u>Route Miles</u>	<u>C-Message Noise Type C2</u>
less than 50	38 dBrnCO
51 to 100	39 dBrnCO
101 to 200	41 dBrnCO
201 to 400	43 dBrnCO
401 to 1,000	45 dBrnCO

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.1 Standard Transmission Specifications (Cont'd)

(B) Type C Transmission Specifications (Cont'd)

(4) C-Notch Noise

The maximum C-Notch Noise, utilizing a -16 dBm0 holding tone is less than or equal to 47 dBmCO.

(5) Echo Control

Echo Control, identified as Return Loss and expressed as Echo Return Loss is dependent on the routing, i.e., whether the service is routed directly from the customer's point of termination (POT) to the end office or via an access tandem. It is equal to or greater than the following:

	<u>Echo Return Loss</u>	<u>Singing Return Loss</u>
POT to Access Tandem	13 dB	6 dB
Pot to End Office - Direct	13 dB	6 dB

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.1 Standard Transmission Specifications (Cont'd)

(C) Reserved for Future Use



**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.1 Standard Transmission Specifications (Cont'd)

(C) Reserved for Future Use

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.2 Data Transmission Parameters

Two types of Data Transmission Parameters, i.e., Type DA and Type DB, are provided for Feature Group C arrangements. The specific applications in terms of the Feature Groups with which they are provided are set forth in Section 6.5, preceding. Following are descriptions of each.

(A) Data Transmission Parameters Type DA

(1) Signal to C-Notched Noise Ratio

The Signal to C-Notched Noise Ratio is equal to or greater than 33 dB.

(2) Envelope Delay Distortion

The maximum Envelope Delay Distortion for the frequency bands and route miles specified is:

604 to 2804 Hz

Less than 50 route miles 500 microseconds

equal to or greater than  
50 route miles

900 microseconds

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.2 Data Transmission Parameters (Cont'd)

(A) Data Transmission Parameters Type DA (Cont'd)

(2) Envelope Delay Distortion (Cont'd)

<u>1,004 to 2,404 Hz</u>	
less than 50 route miles	200 microseconds

equal to or greater than 50 route miles	400 microseconds
--	------------------

(3) Impulse Noise Counts

The Impulse Noise Counts exceeding a 65 dBrnCO threshold in 15 minutes is no more than 15 counts.

(4) Intermodulation Distortion

The Second Order (R2) and Third Order (R3) Intermodulation Distortion products are equal to or greater than:

Second Order (R2)	33 dB
Third Order (R3)	37 dB

(5) Phase Jitter

The Phase Jitter over the 4-300 Hz frequency band is less than or equal to 5 degrees peak-to-peak.

(6) Frequency Shift

The maximum Frequency Shift does not exceed -2 to +2 Hz.

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.2 Transmission Specifications Switched Access Service (Cont'd)11.2.2 Data Transmission Parameters (Cont'd)(B) Data Transmission Parameters Type DB(1) Signal to C-Notched Noise Ratio

The signal to C-Notched Noise Ratio is equal to or greater than 30 dB.

(2) Envelope Delay Distortion

The maximum Envelope Delay Distortion for the frequency bands and route miles specified is:

<u>604 to 2,804 Hz</u>	
less than 50 route miles	800 microseconds
50 route miles	1000 microseconds
<u>1,004 to 2,404 Hz</u>	
less than 50 route miles	320 microseconds
equal to or greater than 50 route miles	500 microseconds

(3) Impulse Noise Counts

The Impulse Noise Counts exceeding a 67 dBmCO threshold in 15 minutes is no more than 15 counts.

(4) Intermodulation Distortion

The Second Order (R2) and Third Order (R3) Intermodulation Distortion products are equal to or greater than:

Second Order (R2)	31 dB
Third Order (R3)	34 dB

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.2 Data Transmission Parameters (Cont'd)

(B) Data Transmission Parameters Type DB (Cont'd)

(5) Phase Jitter

The Phase Jitter over the 4-300 Hz frequency band is less than or equal to 7 degrees peak-to-peak.

(6) Frequency Shift

The maximum Frequency Shift does not exceed -2 to +2 Hz.

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.2 Transmission Specifications Switched Access Service (Cont'd)

11.2.2 Data Transmission Parameters (Cont'd)

(C) Reserved for Future Use

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.3 Special Access Channel Interface and Network Channel Codes

This section explains the Channel Interface codes and Network Channel codes that the customer must specify when ordering Special Access Service, Switched Access Entrance Facilities, and Voice Grade and High Capacity Direct Trunked Transport. Included is an example which explains the specific characters of the code, a glossary of Channel Interface codes, impedance levels, Network Channel codes and compatible Channel Interfaces.

When ordering, the type of Special Access Service or Switched Access entrance Facility or Direct Trunked Transport is described by two code sets, the Network Channel (NC) code and the Network Channel Interface (NCI) codes.

The Network Channel (NC) code consists of two elements. Element one is a Channel Service Code (character positions 1 and 2) that describes the channel service type in an abbreviated form. element two is an Optional Feature Code (character positions 3 and 4) that identifies option codes available for each channel service code, such as C-conditioning or Improved Return Loss.

The Network channel Interface (NCI) is used to identify interface specification associated with a particular channel. This code describes the total wires, protocol, impedance, protocol options and transmission level point(s) reflecting physical and electrical characteristics between the Telephone Company and the customer.

Example: If the customer specifies a NT Network Channel Code and a 2DC8-3 Channel Interface at the customer's premises, the following is being requested:

**ACCESS SERVICE**1. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)

- NT = Metallic Channel with a Predefined Technical Specification Package (1)
- 2 = Number of physical wires at customer premises
- DC = Facility interface for direct current or voltage
- 8 = Variable impedance level
- 3 = Metallic facilities (DC continuity) for direct current/low frequency control signals or slow speed data (30 baud)

11.3.1 Glossary of Channel Interface Codes and Options

<u>Code</u>	<u>Option</u>	<u>Definition</u>
AB -		accepts 20 Hz ringing signal at customer's point of termination
AC -		accepts 20 Hz ringing signal at customer's end user's point of termination
CT -		Centrex Tie Trunk Termination
DA -		data stream in VF frequency band at customer's end user's point of termination
DB -		data stream in VF frequency band at customer's point of termination
-	10	VF for TG1 and TG2
-	43	VF for 43 Telegraph Carrier type signals, TG1 and TG2
DC -		direct current or voltage
-	1	monitoring interface with services RC combination (McCulloh format)
-	2	Telephone Company energized alarm channel
-	3	Metallic facilities (DC continuity) for direct current/low frequency control signals or slow speed data (30 baud)



**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.1 Glossary of Channel Interface Codes and Options (Cont'd)

<u>Code</u>	<u>Option</u>	<u>Definition</u>
DD -		DATAPHONE Select-A-Station (and TABS) interface at customer's point of termination
DE -		DATAPHONE Select-A-Station (and TABS) interface at the customer's end user's point of termination
DS -		digital hierarchy interface
-	15	1.544 Mbps (DS1) format per PUB 41451 plus D4
-	15E	8-bit PCM encoded in one 64 kbps of the DS1 signal
-	15F	8-bit PCM encoded in two 64 kbps of the DS1 signal
-	15G	8-bit PCM encoded in three 64 kbps of the DS1 signal
-	15H	14/11-bit PCM encoded in six 64 kbps of the DS1 signal
-	15J	1.544 Mbps format per PUB 41451
-	15K	1.544 Mbps format per PUB 41451 plus extended framing format
-	15L	1.544 Mbps (DS1) with SF signaling
-	27	274.176 Mbps (DS4)
-	27L	274.176 Mbps (DS4) with SF signaling
-	31	3.152 Mbps (DS1C)
-	31L	3.152 Mbps (DS1C) with SF signaling
-	44	44.736 Mbps (DS3)
-	44L	44.736 Mbps (DS3) with SF signaling
-	63	6.312 Mbps (DS2)
-	63L	6.312 Mbps (DS2) with SF signaling
DU -		Digital access interface
-	24	2.4 kbps

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.1 Glossary of Channel Interface Codes and Options (Cont'd)

<u>Code</u>	<u>Option</u>	<u>Definition</u>
-	48	4.8 kbps
-	56	56.0 kbps
-	96	9.6 kbps
-	A	1.544 Mbps format per PUB 41451
-	B	1.544 Mbps format per PUB 41451 plus D4
-	C	1.544 Mbps format per PUB 41451 plus extended farming format
DX -		duplex signaling interface at customer's point of termination
DY -		duplex signaling interface at customer's end user's point of termination
EA -	E	Type I E&M Lead Signaling. Customer at POT or customer's end user at POT originates on E Lead.
EA -	M	Type I E&M Lead Signaling. Customer at POT or customer's end user at POT originates on M Lead.
EB -	E	Type II E&M Lead Signaling. Customer at POT or customer's end user at POT originates on E Lead.
EB -	M	Type II E&M Lead Signaling. Customer at POT or customer's end user at POT originates on M Lead.
EC -		Type III E&M signaling at customer POT
EX -	A	Tandem channel unit signaling for loop start or ground start and customer supplies open end (dial tone, etc.) functions.
EX -	B	Tandem channel unit signaling for loop start or ground start and customer supplies closed end (dial pulsing, etc.) functions.
GO -		Ground start loop signaling - open end function by customer or customer's end user.

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.1 Glossary of Channel Interface Codes and Options (Cont'd)

<u>Code</u>	<u>Option</u>	<u>Definition</u>
GS	-	Ground start loop signaling - closed end function by customer or customer's end user.
IA	-	E.I.A. (25 pin RS-232)
LA	-	end user loop start loop signaling - Type A OPS registered port open end.
LB	-	end user loop start loop signaling - Type B OPS registered port open end.
LC	-	end user loop start loop signaling - Type C OPS registered port open end.
LO	-	loop start loop signaling - open end function by customer or customer's end user.
LR	-	20 Hz automatic ringdown interface at customer with Telephone Company provided PLAR.
LS	-	loop start loop signaling - closed end function by customer or customer's end user
NO	-	no signaling interface, transmission only.
PG	-	program transmission - no dc signaling.
	- 1	nominal frequency from 50 to 15,000 Hz.
	- 3	nominal frequency from 200 to 3,500 Hz.
	- 5	nominal frequency from 100 to 5,000 Hz.
	- 8	nominal frequency from 50 to 8,000 Hz.
PR		protective relaying*.

\*Available only for the transmission of audio tone protective relaying signals used in the protection of electric power systems during fault conditions.

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.1 Glossary of Channel Interface Codes and Options (Cont'd)

<u>Code</u>	<u>Option</u>	<u>Definition</u>
RV -	0	reverse battery signaling, one way operation, originate by customer.
-	T	reverse battery signaling, one way operation, terminate function by customer or customer's end user.
SF -		single frequency signaling with VF band at either customer POT or customer's end user POT.
TF -		telephotograph interface.
TT -		telegraph/teletypewriter interface at either customer POT or customer's end user POT.
-	2	20.0 milliamperes.
-	3	3.0 milliamperes.
-	6	62.5 milliamperes.
TV -		television interface.
-	1	combined (diplexed) video and one audio signal.
-	2	combined (diplexed) video and two audio signals.
-	5	video plus one (or two) audio 5 kHz signal(s) or one (or two) two-wire.
-	15	video plays one (or two) audio 15 kHz signal(s).

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.2 Impedance

The nominal reference impedance with which the channel will be terminated for the purpose of evaluating transmission performance:

<u>Value (ohms)</u>	<u>Code(s)</u>
110	0
150	1
600	2
900	3+
135	5
75	6
124	7
Variable	8
100	9

- + For those interface codes with a 4-wire transmission path at the customer designated POT, rather than a standard 900 ohm impedance, the code (3) denotes a customer provided transmission equipment termination. Such terminations were provided to customers in accordance with the F.C.C. Docket No. 20099 Settlement Agreement.

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.3 Digital Hierarchy Channel Interface Codes (4DS)

Customers selecting the multiplexed four-wire DSX-1 or higher facility interface option at the customer designated premises will be requested to provide subsequent system and channel assignment data. The various digital bit rates in the digital hierarchy employ the channel interface code 4DS8, 4DS0 or 4DS6 plus the speed options indicated below:

<u>Interface Code and Speed Option</u>	<u>Nominal Bit Rate (Mbps)</u>	<u>Digital Hierarchy Level</u>
4DS8-15	1.544	DS1
4DS8-31	3.152	DS1C
4DS0-63	6.312	DS2
4DS6-44	44.736	DS3
4DS6-27	274.176	DS4

11.3.4 Service Designator/Network Channel Code Conversion Table

The purpose of this table is to show the relationship between the service designator codes (e.g., VGC, MT2, etc.) and the network channel codes that are used for:

<u>Service Designator Code</u>	<u>Network Channel Code</u>
MTC	MQ
MT1	NT
MT2	NU
MT3	NV
TGC	NQ
TG1	NW
TG2	NY
VGC	LQ
VG1	LB

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.4 Service Designator/Network Channel Code Conversion Table (Cont'd)

<u>Service Designator Code</u>	<u>Network Channel Code</u>
VG2	LC
VG3	LD
VG4	LE
VG5	LF
VG6	LG
VG7	LH
VG8	LJ
VG9	LK
VG10	LN
VG11	LP
VG12	LR
APC	PQ
AP1	PE
AP2	PF
AP3	PJ
AP4	PK
TVC	TQ
TV1	TV
TV2	TW
DA1	XA
DA2	XB
DA3	XG
DA4	XH
HCO	HS
HC1	HC
HC1C	HD
HC2	HE
HC3	HF
HC4	HG

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces

The following tables show the channel interface codes (CIs) which are compatible:

(A) MetallicCompatible CIs

2DC8-1	2DC8-2
--------	--------

2DC8-3	2DC8-3
--------	--------

4DS8-*	2DC8-1
--------	--------

4DS8-*	2DC8-2
--------	--------

\* See Section 11.3.3, preceding, for explanation.



**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
2AB2	2AC2	2DB2	2DA2	2LR2	2LR2
2AB3	2AC2	2DB3	2DA2	2LR3	2LR2
2CT3	2DY2	2DX3	2LA2	2LS2	2LA2
	4DS8*		2LB2		2LB2
	4DX2		2LC2		2LC2
	4DX3		2LO3		
	4DY2		2LS2	2LS3	2LA2
	4EA2-E		2LS3		2LB2
	4EA2-M				2LC2
	4SF2	2GO2	2GS2		
	4SF3		2GS3	2NO2	2DA2
	6DX2				2NO2
	6DY2	2GO3	2GS2		
	6DY3		2GS3	2NO3	2NO2
	6EA2-E				2PR2
	6EA2-M	2LO2	2LS2		
	6EB2-E		2LS3	2TF3	2TF2
	6EB2-M				
	6EB3-E	2LO3	2LS2		
	8EB2-E		2LS3		
	8EB2-M				
	8EC2				
	9DY2				
	9DY3				
	9EA2				
	9EA3				

\* See Section 11.3.3, preceding, for explanation.

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)

11.3.5 Compatible Channel Interfaces (Cont'd)

(B) Voice Grade (Cont'd)

Compatible CIs

4AB2	2AC2
	4AB2
	4AC2
	4SF2

4AB3	2AC2
	4AC2
	4SF2

4AC2	2AC2
	4AC2

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>	<u>Compatible CIs</u>
		4DS8-* 2AC2	4DS8-* 4DG2
		2DA2	4LR2
		2DY2	4LS2
		2GO2	4NO2
4DA2	4DA2	2GO3	4PR2
		2GS2	4RV2-T
4DB2	2DA2	2GS3	4SF2
	2NO2	2LA2	4SF3
	2PR2	2LB2	4TF2
	4DA2	2LC2	6DA2
	4DB2	2LO2	6DY2
	4NO2	2LO3	6DY3
	4PR2	2LR2	6EA2-E
	6DA2	2LS2	6EA2-M
		2LS3	6EB2-E
4DD3	2DE2	2NO2	6EB2-M
	4DE2	2PR2	6GS2
		2RV2-T	6LS2
		2TF2	8EB2-E
		4AC2	8EB2-M
		4DA2	9DY2
		4DE2	9DY3
		4DX2	9EA2
		4DX3	9EA3
		4DY2	
		4EA2-E	
		4EA2-M	

\* See Section 11.3.3, preceding, for explanation.

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>	<u>Compatible CIs</u>	<u>Compatible CIs</u>
4DX2 2DY2	4DX2 8EB2-E	4DX3 6DY2
2LA2	8EB2-M	6DY3
2LB2	9DY2	6EA2-E
2LC2	9DY3	6EA2-M
2LO3	9EA2	6EB2-E
2LS2	9EA3	6EB2-M
2LS3		6LS2
2RV2-T	4DX3 2DY2	8EB2-E
4DX2	2LA2	8EB2-M
4DY2	2LB2	9DY2
4EA2-E	2LC2	9DY3
4EA2-M	2LO3	9EA2
4LS2	2LS2	9EA3
4RV2-T	2LS3	
4SF2	2RV2-T	4DY2 2DY2
4SF3	4DX2	4DY2
6DY2	4DX3	
6DY3	4DY2	
6EA2-E	4EA2-E	
6EA2-M	4EA2-M	
6EB2-E	4LS2	
6EB2-M	4RV2-T	
6LS2	4SF2	
	4SF3	

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4EA2-E	2DY2	4EA3-E	2DY2	4GO2	2G02
	4DY2		4DY2		2GO3
	4EA2-E		4EA2-E		2GS2
	4EA2-M		4EA2-M		2GS3
	4SF2		4SF2		4GS2
	6DY2		6DY2		4SF2
	6DY3		6DY3		6GS2
	6EB2-E		6EA2-E		
	6EB2-M		6EA2-M	4GO3	2G02
	8EB2-E		6EB2-E		2GS2
	8EB2-M		6EB2-M		2GS3
	9DY2		8EB2-E		4GS2
	9DY3		9EB2-M		4SF2
			9DY2		6GS2
			9DY3		
4EA2-M	2DY2		9EA2		
	4DY2		9EA3		
	4EA2-M				
	4SF2				
	6DY2				
	6DY3				
	6EB2-E				
	6EB2-M				
	8EB2-E				
	8EB2-M				
	9DY2				
	9DY3				

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4LO2	2LS2	4LS3	2LA2	4SF2	2LO3
	2LS3		2LB2		2LR2
	4LS2		2LC2		2LS2
	4SF2		2LO2		2LS3
	6LS2		2LO3		2RV2-T
4LO3	2LS2	4NO2	4SF2	4SF3	4AC2
	2LS3		2DA2		4DY2
	4LS2		2DE2		4LS2
	4SF2		2NO2		4RV2-T
	6LS2		4DA2		4SF2
4LR2	2LR2	4RV2-O	4DE2		6DY2
	4LR2		4NO2		6DY3
	4SF2		6DA2		6GS2
4LR3	2LR2	4SF2	2RV2-T		9DY2
	4LR2		4RV2-T		9DY3
	4SF2		4SF2		2DY2
4LS2	2LA2	4SF2	2AC2		2GO3
	2LB2		2DY2		2GS2
	2LC2		2GS2		2GS3
	2LO2		2GS3		2LA2
	2LO3		2LA2		2LB2
			2BL2		2LC2
			2LC2		2LO3
					2LR2

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
4SF3	2LS2	6DA	4DA2	6DY3	2DY2
	2LS3		6DA2		4DY2
	2RV2-T				6DY2
	4DY2	6DX2	2DY2		6DY3
	4EA2-E		4DY2		
	4EA2-M		4EA2-E	6EA2-E	2AC2
	4GS2				
	4LR2		4EA2-M		2DY2
	4LS2		4SF2		2LA2
	4RV2-T		6DY2		2LB2
	4SF2		6DY3		2LC2
	4SF3		6EA2-E		2LO3
	6DY2		6EA2-M		2LS2
	6DY3		6EB2-E		2LS3
	6EB2-E		6EB2-M		2RV2-T
	6EB2-M		8EB2-E		4AC2
	6GS2		8EB2-M		4DY2
	6LS2		9DY2		4EA2-E
	9DY2		9DY3		4EA2-M
	9DY3		9EA2		4LS2
	9EA2		9EA3		4RV2-T
	9EA3				4SF2
		6DY2	2DY2		4SF3
4TF2	2TF2		4DY2		6DY2
	4TF2		6DY2		6DY3
					6EA2-E
					6EA2-M

## ACCESS SERVICE

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6EA2-E	6EB2-E	6EA2-M	6DY2	6EB3-E	2DY2
	6EB2-M		6DY3		4DY2
	6LS2		6EA2-M		4EA2-E
	8EB2-E		6EB2-E		4EA2-M
	8EB2-M		6EB2-M		4SF2
	9DY2		6LS2		6DY2
	9DY3		8EB2-E		6DY3
			8EB2-M		6EA2-E
6EA2-M	2AC2		9DY2		6EA2-M
	2DY2		9DY3		8EB2-E
	2LA2				8EB2-M
	2LB2	6EB2-E	2DY2		9DY2
	2LC2		4DY2		9DY3
	2LO3		4SF2		9EA2
	2LS2		6DY2		9EA3
	2LS3		6DY3		
	2RV2-T		6EB2-E	6EX2-A	2GS2
	4AC2		6EB2-M		2GS3
	4DY2		9DY2		2LS2
	4EA2-E		9DY3		2LS3
	4EA2-M				4GS2
	4LS2	6EB2-M	2DY2		4LS2
	4RV2-T		4DY2		4SF2
	4SF2		4SF2		6GS2
	4SF3		6DY2		6LS2
			6DY3		
			6EB2-M		
			9DY2		
			9DY3		



**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
6EX2-B	2GO3	8EB2-E	2AC2	8EB2-M	2AC2
	2LA2		2DY2		2DY2
	2LB2		2LA2		2LA2
	2LC2		2LB2		2LB2
	2LO2		2LC2		2LC2
	2LO3		2LO3		2LO3
	2LR2		2LS2		2LS2
	4LR2		2LS3		2LS3
	4SF2		2RV2-T		2RV2-T
			4AC2		4AC2
6GO2	2GO2		4DY2		4DY2
	2GS2		4LS2		4LS2
	2GS3		4RV2-T		4RV2-T
	4GS2		4SF2		4SF2
	4SF2		4SF3		4SF3
	6GS2		6DY2		6DY2
6LO2			6DY3		6DY3
	2LS2		6EB2-E		6EB2-E
	2LS3		6EB2-M		6EB2-M
	4LS2		6LS2		6LS2
	4SF2		8EB2-E		8EB2-M
	6LS2		8EB2-M		9DY2
6LS2			9DY2		9DY3
			9DY3		
	2LA2				
	2LB2				
	2LC2				
	2LO2				
	2LO3				
	4SF2				

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)11.3.5 Compatible Channel Interfaces (Cont'd)(B) Voice Grade (Cont'd)

<u>Compatible CIs</u>		<u>Compatible CIs</u>		<u>Compatible CIs</u>	
8EC2	2DY2	9DY2	2DY2	9EA3	2DY2
	4DY2		4DY2		4DY2
	4EA2-E		6DY2		4EA2-E
	4EA2-M		6DY3		4EA2-M
	4SF2		9DY2		6DY2
	6DY2				6DY3
	6DY3	9DY3	2DY2		6EA2-E
	6EA2-E		4DY2		6EA2-M
	6EA2-M		6DY2		6EB2-E
	6EB2-E		6DY3		6EB2-M
	6EB2-M		9DY2		8EB2-E
	8EB2-E		9DY3		8EB2-M
	8EB2-M				9DY2
	9DY2	9EA2	2DY2		9DY3
	9DY3		4DY2		9EA3
	9EA2		4EA2-E		
	9EA3		4EA2-M		
			6DY2		
			6DY3		
			6EA2-E		
			6EA2-M		
			6EB2-E		
			6EB2-M		
			8EB2-E		
			8EB2-M		
			9DY2		
			9DY3		
			9EA2		
			9EA3		

(N)

ACCESS SERVICE

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.3 Special Access Channel Interface and Network Channel Codes (Cont'd)

11.3.5 Compatible Channel Interfaces (Cont'd)

(C) Reserved for Future Use

(D) High Capacity

Compatible CIs

4DS8-15    4DS8-15+  
                  4DU8-B

6DU8-8

Compatible CIs

4DU8-A,B  
or C

4DU8-A,B  
or C

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.4 WATS Access Line Standard Transmission Specifications11.4.1 Standard Two-Wire Voice Transmission Specifications(A) Loss Deviation

The maximum Loss Deviation of the 1,004 Hz loss relative to the Expected Measured Loss (EML) is plus or minus 4.0 dB.

(B) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 2,804 Hz frequency band relative to the loss at 1,004 Hz in -3.0 dB to +9.0 dB.

(C) C-Message Noise

The maximum C-Message Noise for the transmission path at the route miles listed is less than:

<u>Route Miles</u>	<u>C-Message Noise</u>
less than 50	35 dBrnCO
51 to 100	37 dBrnCO
101 to 200	40 dBrnCO
201 to 400	43 dBrnCO
401 to 1,000	45 dBrnCO

(D) Echo Control

Return Loss for both Echo Return Loss (ERL) and Singing Return Loss (SRL), is equal to or greater than:

ERL	6.0 dB
SRL	3.0 dB

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.4 WATS Access Line Standard Transmission Specifications (Cont'd)11.4.2 Standard Four-Wire Voice Transmission Specifications(A) Loss Deviation

The maximum Loss Deviation of the 1,004 Hz loss relative to the Expected Measured Loss (EML) is -3.0 dB to +3.0 dB.

(B) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 2,804 Hz frequency band relative to loss at 1,004 Hz is -1.0 dB to +4.5 dB.

(C) C-Message Noise

The Maximum C-Message Noise for the transmission path at the route miles listed is less than:

<u>Route Miles</u>	<u>C-Message Noise</u>
less than 50	35 dBmCO
51 to 100	37 dBmCO
101 to 200	40 dBmCO
201 to 400	43 dBmCO
401 to 1,000	45 dBmCO

(D) Echo Control

The Equal Level Echo Path Loss for both Echo Return Loss (ERL) and Singing Return Loss (SRL), is equal to or greater than:

ERL	15.0 dB
SRL	9.0 dB

**ACCESS SERVICE**

11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)

11.5 WATS Access Line Data Transmission Parameters

11.5.1 Signal to C-Notched Noise Ratio

The maximum Signal-to-C-Notched Noise Ratio is 30 dB.

11.5.2 Envelope Delay Distortion

The maximum Envelope Delay Distortion for the frequency bands specified is:

1,000 microseconds	604 to 2,804 Hz
500 microseconds	1,000 to 2,404 Hz

11.5.3 Impulse Noise Counts

The Impulse Noise Counts exceeding a 67 dBrnCO threshold in 15 minutes is no more than 15 counts.

Intermodulation Distortion

The Second Order (R2) and Third Order (R3) Intermodulation Distortion products are equal to or greater than:

Second Order (R2)	31 dB
Third Order (R3)	34 dB

11.5.4 Phase Jitter

The Phase Jitter over the 4 to 300 Hz frequency band is less than or equal to 7 degrees peak-to-peak.

11.5.5 Frequency Shift

The maximum Frequency Shift does not exceed -2 to +2 Hz.

**ACCESS SERVICE**11. Interface Groups, Transmission Specifications and Channel Interfaces (Cont'd)11.6 WATS Access Line Transmission Specifications11.6.1 Improved Two-Wire Voice Transmission Specifications(A) Loss Deviation

The maximum Loss Deviation of the 1,004 Hz loss relative to the Expected Measured Loss (EML) is -4.0 to +4.0 dB.

(B) Attenuation Distortion

The maximum Attenuation Distortion in the 404 to 280 Hz frequency band relative to loss at 1,004 Hz is -2.0 dB to +6.0 dB.

(C) C-Message Noise

The maximum C-Message Noise for the transmission path at the route miles listed is less than:

<u>Route Miles</u>	<u>C-Message Noise</u>
less than 50	35 dBrnCO
51 to 100	37 dBrnCO
101 to 200	40 dBrnCO
201 to 400	43 dBrnCO
401 to 1,000	45 dBrnCO

(D) Return Loss

The Return Loss, expressed as Echo Return Loss (ERL) and Singing Return Loss (SRL), is equal to or greater than:

ERL	13.0 dB
SRL	6.0 dB